

# MEMORANDUM

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DATE: January 4, 1985

TO: John Osborn, FIT RPO, USEPA, Region X

FROM: Andrew Hafferty, Project Manager for Resource Recovery  
Landfill, Tier 2A Dioxin Investigation

THRU: Dave Buecker, FIT RPM, E&E, Seattle

SUBJ: Proposed Dioxin and Di-benzo Furan analyses for the five  
Region X Tier 2A dioxin sites currently under  
investigation by E&E

REF: TDD R10-8410-12 Alkali Lake  
TDD R10-8410-13 St. John's Landfill  
TDD R10-8410-14 Resource Recovery Corp.  
TDD R10-8412-04 EnviroSafe Services of Idaho, Inc.  
TDD R10-8412-05 Chem-Security Systems, Inc.

CC: Bill Rittaler, E&E, Seattle

Jeff Villnow, E&E, Seattle

Thomas Tabin, E&E, Seattle

Larry Gorelik, E&E, Seattle

Lori Cohen, EPA, Region X

Ben Eusebio, EPA, Region X

Jim Everts, EPA, Region X

USEPA SF



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A major question in these dioxin studies that must be resolved is: Exactly which isomers are the samples to be analyzed for? In order to best answer this question, the following persons have been contacted: Paula Auserer of the Sample Management Office, Joyce Woods of the EPA Region 7, Mike Mille of California Analytical Laboratories, and Dave Miller of Battelle Laboratories.

The following points summarize current thoughts regarding possible analytical approaches.

1. There are 75 polychlorinated dibenzo-p-dioxin isomers. PCDDs
2. There are 135 polychlorinated dibenzofuran isomers. PCDFs
3. Not all isomers can be analyzed for, nor is the chemistry and toxicology of all the isomers understood.
4. In Lori Cohen's memo of December 24, 1984, it was suggested that 5 to 12 of the most toxic isomers be chosen for analysis.
5. These isomers have been identified and are listed below.

2,3,7,8-Tetra-CDD	2,3,7,8-Tetra-CDF
1,2,3,7,8-Penta-CDD	1,2,3,7,8-Penta-CDF
1,2,3,6,7,8-Hexa-CDD	2,3,4,7,8-Penta-CDF
1,2,3,7,8,9-Hexa-CDD	1,2,3,6,7,8-Hexa-CDF
1,2,3,4,7,8-Hexa-CDD	1,2,3,7,8,9-Hexa-CDF
	1,2,3,4,7,8-Hexa-CDF
	2,3,4,6,7,8-Hexa-CDF

6. However, the most toxic isomers may not be the most predominant forms. <sup>Isomers chosen based on a</sup> combination of toxicity and isomer distribution would provide more useful analytical

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information data. Unfortunately, due to a lack of complete <sup>background</sup> data, it is not possible to identify these isomers.

7. If only a small select group of isomers is analyzed for, then only those isomers can be discussed or accounted for.
8. Isomer specific analyses will cost ~~on the order of~~ from \$300 to \$500 per isomer.
9. "Total" dioxins and "total" furans analyses are an alternative but the data provided by such an analysis would have only limited usefulness.
10. Homology analyses, i.e. analysis of isomer groups based on the total number of chlorine atoms <sup>per molecule</sup> should be seriously considered.
11. If PCDDs and PCDFs are positively identified, specific isomers may be analyzed for, if that information is required and if standards exist.
12. Cost estimates for complete homology analyses for dioxin and furan range from \$1200 to \$1600 per sample.
13. It appears that the EPA mandated detection limit of one ppb can be met without significant difficulties.
14. Homology analyses can provide maximum information at minimum cost.